

Novel Catalysts for Continuous Operation Bosch Reactor, Phase I

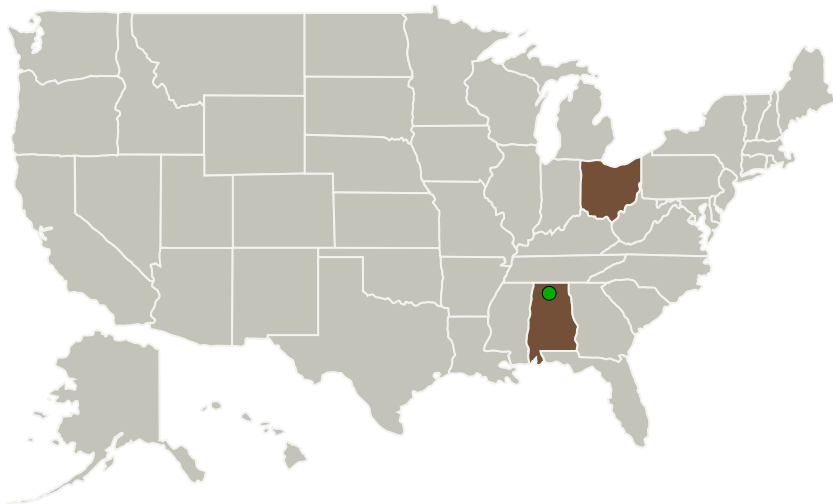
Completed Technology Project (2011 - 2011)



Project Introduction

NASA has a need for process technologies that enable life support loop closure for manned exploration missions beyond earth's atmosphere. A critical component in life support loop closure is the removal of carbon dioxide (produced by the crew) from the cabin atmosphere. An attractive approach for removal of carbon dioxide is the Bosch reaction, where carbon dioxide is reacted with hydrogen (produced from water electrolysis) to produce solid elemental carbon and water. However, no technology currently exists for the continuous operation of a Bosch reactor. The process cannot be run in a continuous manner because of degradation of the catalysts, which are required to precipitate carbon at a reasonable rate. In this Phase I SBIR, PH Matter, LLC will develop a catalyst for the continuous formation of carbon in a system fed with carbon dioxide and hydrogen. Researchers will demonstrate continuous operation of the catalyst in Phase II. Based on the catalyst performance, a reactor will be designed to allow continuous carbon formation without the need for regular maintenance.

Primary U.S. Work Locations and Key Partners

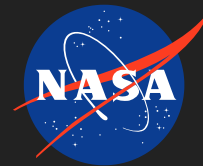


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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
PH Matter, LLC	Lead Organization	Industry Historically Underutilized Business Zones (HUBZones)	Columbus, Ohio
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations

Alabama	Ohio
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Project Transitions

**February 2011:** Project Start**September 2011:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/138368>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

PH Matter, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Paul H Matter

Co-Investigator:

Paul Matter

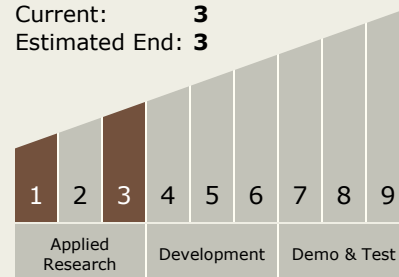
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Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.3 Waste Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System